121 and supplementary information on adult Papago Indians, the data to be presented
122 in the form of a detailed listing of information on individuals, accompanied by
657 an interpretive summary report. (2) A survey of the current use by Indians of
[129] Papago agricultural and stock raising resources. This material, plus much other information on the Papago and the Papago reservations which had been gathered through the years by the University of Arizona, is contained in the following report.

The most important additional information consists of the demographic and sociological data contained in the Bureau of Ethnic Research Papago Population Register which was assembled under the sponsorship of the National Cancer Institute. It was understood that the manpower information in Chapter IV of this report would be drawn principally from our Papago Population Register which, incidentally, was not completed until the first week in October of this year.

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657 Members of the staff of the Bureau of Ethnic Research, in connection with the above contract, have also agreed to serve as consultants in the preparation of a Papago Development Program which will be based, in part, upon the material in this report. The need for such a Program was stated fully in the 1958 Association for Papago Affairs resolution:

> "Whereas, the Papago Indian Tribe, the second largest tribe of Indians in Arizona, has repeatedly asked for an assistance program from the federal government in the form of the Papago Development Program which was written almost ten years ago; and
>
> "Whereas, the Papago Development Program, no longer considered to be applicable by the Bureau of Indian Affairs, was written without sound knowledge of certain basic facts about the Papago people and their reservation such as: The size of the Papago Tribe; the residence patterns of its members; detailed and quantified information concerning family income; the extent and composition of the Papago labor force; trends in Papago economic adjustment; conditions of Papago health, education, and welfare; the economic potential of the reservation, especially mineral deposits, etc.; and

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Soils and Minerals. The greatest portion of the Papago Reservation is composed of alluvium weathered from the scattered hills and mountains, and which grades from coarse to fine as distance increases from the source. In the valley floors the soil varies from fine sand to sandy clay and clay, all suitable for agriculture where water is available.

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Although in the latter part of the nineteenth century mining brought large numbers of people to the Papago country and several sizable settlements flourished for brief periods, mineral resources have not yet been discovered which would be suitable for large-scale, long-term development. No oil or gas has been found, and promising formations are absent. Highly mineralized formations, mainly Pre-Cambrian and Mesozoic, have produced limited amounts of gold, silver, lead and manganese. Workable copper deposits exist close to and on the San Xavier Reservation, and are being mined on a large scale.

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Climate. The Sonoran Desert, in which the Papago country lies, is part of a series of deserts occupying about 440,000 square miles in the southwestern U. S. and northwestern Mexico. It is desert in both the colloquial and technical senses, with potential evaporation 8 to 10 times greater than rainfall. Although long records of rainfall, temperature, and other details of weather are scanty for the Papago Reservation, recent records can be used in conjunction

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132 [127] with data from nearby areas such as Tucson and Ajo to provide a sufficiently accurate picture for this report (see Map 2.) The highest precipitation is in the Baboquivari Mountains, where the annual average is about 20 inches at high elevations. A few miles to the west, at lower elevations, the annual average is only 12 to 14 inches, and as one goes toward the west and north the trend is steadily drier, with average rainfall of 10 inches or less at the west edge of the reservation and less than 7 inches at the extreme north. Fully as important as the general scarcity of precipitation is the nature of its occurrence--divided between a summer season of scattered, intense storms from July to mid-September, and a winter season of gentler, more widespread rains from early December to early March. The annual total varies tremendously for any locality, so that averages mean little to anyone depending on rainfall during any given year for farming and stock raising. At Ajo, about 10 miles beyond the western edge of the reservation, records have been kept since 1914. For every month but July and August a monthly total of zero inches has been recorded at least once, and even July and August have had monthly totals as low as 0.04 and 0.20 inches respectively.

Although temperature and humidity are less crucial components of the climate than is precipitation, the long, hot season prior to the summer rains, the characteristically low humidity throughout the year, and the wide daily range in temperature are significant factors in the enviroment.

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Papago Settlements. It is essential to the understanding of Papago settlement patterns and Papago social, economic and political life to reduce the confusion of Papago place name lists to a system of classification that underlines the differences that exist from one settlement to another.

At least five and perhaps six placename surveys have been conducted in this area since 1915. M. V. Clotts (1915), working for the Department of the Interior, located settlements of all types and took particular notice of the number of houses, the settlement economy, and the condition of the well in each settlement.

J. W. Hoover (1935) interviewed villagers to discover their origin. He published a map showing the "Generic Descent of Papago Villages". This study is important because it places settlements, which are no longer important, in their historic roles in the ever-changing communities on the reservation.

Alden Jones (1944) made a survey to identify the ever-increasing number of new locations on the reservation. On the basis of his work, W. H. Coulson, draftsman for the Bureau of Indian Affairs, compiled and drew a reservation map indicating the location of settlements, roads, wells, charcos, dams, and telephone or power lines. No distinction was made, however, in the size or importance of the settlements. A large black dot merely indicated a ". . . village or community scattered over a mile or so."

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Again the Bureau of Indian Affairs attempted to reduce the confusion by securing the approval of the National Board of Geographic Names for a list of designations approved by the Papago Tribe, (Papago Place Names, 1957). Highway maps commonly use these "official" names and we have maintained this tradition.

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Confusion in place names, however, is likely to continue. Anglos constantly refer to Quijotoa as Covered Wells, Gu Vo as Kerwo and Wahak Hotonok as San Simon or Tracy's. Indians, among themselves, sometimes have names for villages which are seldom heard and never used by Anglos. Sells, for example, is most commonly referred to as /Ch'onideke/ or /Komkoch-ethe-e-Ch'onideke/ (turtle-caught-in-a-crack). Nevertheless, interviews with 32 Indian informants disclosed that official names are usually the ones used by Papagos with, of course, the Papago pronunciation. Exceptions, in addition to Sells, are Jewake for Quijotoa, Keiie Heke for Santa Rosa, San Simon for Wahak Hotonok and Wank for San Xavier.

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Villages. The Bureau of Ethnic Research at the University of Arizona, in connection with various studies, has compiled an exhaustive list of Papago place names. In total, 173 separate names were listed, but only 149 have been positively identified and accounted for as separate and distinct locations. From this list of 149 locations, 45 settlements were considered by Delmos Jones (1962) to be villages.

that the difference between 5,313 and the 1959 population of 11,775 represents an absolute increase in population. This is approximately two per cent a year, well within normal expectation. The important point is that the Papago have not attempted to maintain an increasing population on the same land base but are moving off the reservation at a rate about equal to, or exceeding, the rate of natural increase.

The Clotts survey contains other interesting data on Papago settlements. Clotts listed, in his description of settlements, wells, fields, and so on, the population of 52 locations (see Map 5). Of these only 19 had a population of 100 or more, the largest being Topawa (500), Santa Rosa (400), San Miguel (325), Gu Oidak (Big Fields) (250), and Anegam (200). The care with which Clotts appears to have made his estimates, and his systematic recording of many details at each location visited, justifies the placing of considerable confidence in these estimates.

A comparison of populations by district on the main reservation is given in Table 3.

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Table 3. Papago Population by Districts 1914 and 1959

District	1914 (Clotts)	1959 (BFR)
Baboquivari	949	562
Chukut Kuk	512	214
Gu Achi	695	531
Gu Vo	200	230
Hickiwan	222	346
Pisinimo	396	330
Schuk Toak	565	370
Sells	659	1,026
Sif Oidak	1,115	552
Total	5,313	4,161

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The Present Population. The information which follows is derived from a Papago population register secured by the Bureau of Ethnic Research in 1958 and 1959 in connection with a research project sponsored and in major part financed by the Biometry Branch of the National Cancer Institute. The work was under the direction of Dr. Robert A. Hackenberg and cooperating agencies were the Papago Tribe, the Division of Indian Health of the Public Health Service, the Bureau of Indian Affairs, and the Arizona State Office of Vital Statistics.

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A population register is not a census. It is intended to serve as a permanent record of identifiable

127 work was pursued until the enumeration of new people became
128 so infrequent as to not justify additional expenditures. Records were searched until new data became so scanty or so difficult to handle, that additional work could not be justified.

127 Because we were seeking to secure data on all
125 living Papagos, no matter where they lived, we could not use the relatively simple method of house-to-house enumeration perfected by the United States Census Office. We were forced, instead, to identify individuals in a kinship context and to interview informants to secure names, whereabouts, and other facts pertaining to members of kinship groups.

For this reason, and because we could not rely upon name, date of birth, sex and residence as fully reliable identifying criteria, our interviews were long, tedious and
127 complicated. Reliability, we know, diminished in our
128 reservation interview material as a direct function of the number of years an individual had been gone from the reservation. Da.. is weakest for Papagos resident outside of Arizona. Through the cooperation of the Arizona State Office of Vital Statistics, we were able to process Papago birth and death certificates originating in Arizona. We could not secure such information from other states where Papagos are not identified except as "Indian".

Data from records was available for only about two thirds of the individuals enumerated. Such data as kinship, present residence, village of origin, employment, and the educational level of adults, was secured entirely from field interviews.

A census defines the individuals to be enumerated in terms of their geographical location. A population register defines individuals on the basis of their membership in a specific group. One of our first tasks, therefore, was to define a Papago. The definition used by Dr. Hackenberg (1961) is given below. It can be made operational because we have records of the individual builders of dwellings on the three Papago reservations*, and because we have lineage data which give us the network of Papago kin ties.

1. A person will be considered a Papago Indian if he constructed a house within the limits of the Papago Reservations (Sells, San Xavier and Gila Bend), unless he fails to meet the terms of #3 below.

2. A person will be considered a Papago Indian if he is either a lineal or collateral relative of such a housebuilder unless he fails to meet the terms of #3 below.

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* Papagos do not live on the Gila Bend Reservation. Papagos living adjacent to the Reservation, however, are traditionally considered "reservation Papagos".

members of a distinctive group -- in this case the Papago -- and, except for its non-legal status, amounts to a tribal roll. Although of potential value to tribal and federal administrators, the Papago population register is primarily a research tool. It is a "universe" of individuals who are the descendants of members of the Papago tribe in pre-reservation days. It is not confined, therefore, to the present residents of the Papago reservations, but includes identifiable Papagos wherever they may be living. A great deal of information can be secured from the register as it now stands, and changes in the register which will take place as it is maintained through time will provide additional data for analysis. Of even greater importance will be its use as a total population record from which samples may be drawn for a wide variety of social, economic, and health studies. It was, of course, an interest in studies of Indian health that led the National Cancer Institute to support the preparation of a Papago population register.

Methods and techniques used in the preparation of the register, together with full reports on the data secured, have been and will be published by Dr. Robert A. Hackenberg (1961). The problem of the reliability of the data, however, should be mentioned here.

No test has been conducted to determine the extent of over enumeration, under enumeration, or false enumeration. This will be done in the near future. Field

trained management and the use of fertilizers, insect control and expensive farm equipment and water pumps. 241

Flood water farming, as it has been practiced since prehistoric days on the Papago Reservation, consists of the use of surface runoff of rain water at those spots where it could be collected and spread, either at the mouth of an arroyo or along stream beds in the larger valleys. Various names have been used to describe this technique: "akchin farming" (akchin being the Papago word for the mouth of an arroyo), "flash flood farming," and "dry farming." Actually, [179] since the introduction of wheat by Europeans, dry farming, which depends directly upon moisture from rainfall, has been used by the Papago in raising winter wheat. Corn, beans, and squash, however, which must be grown in summer, depend upon flood water which can only be supplied by the artificial spreading of moisture from intermittent streams.

Periodic surveys and estimates made by the Bureau of Indian Affairs show that flood water farming on the main reservation has steadily declined during the past 50 years. How far the decline has gone, however, is not known. In an effort to secure this information the Bureau of Indian Affairs has been systematically carrying out a farm survey during the past five years. Thus far, only the southeastern part of the main reservation has been surveyed (Chukut Kuk, Baboquivari, and the southern part of the Sells district).

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Table 27. Welfare Cases and Payments to Papago Reservation Residents, Fiscal Years 1958 through 1962. (Source: State and Federal welfare statistical reports).

Category	Average Monthly Cases	Average Monthly Payments	Estimated Annual Payments
1958			
Old Age Assistance	273	$14,884	
Aid Dependent Children	102	9,331	
Aid to the Blind	9	603	
General Assistance	72	3,710	
Child Welfare	17	993	
Total	473	29,521	$354,252
1959			
Old Age Assistance	266	15,133	
Aid Dependent Children	102	9,644	
Aid to the Blind	7	482	
General Assistance	73	4,218	
Child Welfare	17	999	
Total	465	30,478	365,736
1960			
Old Age Assistance	255	16,161	
Aid Dependent Children	119	12,656	
Aid to the Blind	8	545	
General Assistance	70	4,489	
Child Welfare	8	810	
Total	460	34,661	415,932
1961			
Old Age Assistance	257	15,801	
Aid Dependent Children	135	14,540	
Aid to the Blind	9	594	
General Assistance	87	5,499	
Child Welfare	12	949	
Total	500	37,383	448,596
1962			
Old Age Assistance	266	16,191	
Aid Dependent Children	134	16,680	
Aid to the Blind	12	613	
General Assistance	104	4,624	
Child Welfare	n.a.	1,375	
Total	5364	39,483	473,796